

We claim:

1. A process for preparing optically active hydroxy-, alkoxy-, amino-, alkyl-, aryl- or chlorine-substituted alcohols or hydroxy carboxylic acids having from 3 to 25 carbon atoms or their acid derivatives or cyclization products by hydrogenating the correspondingly substituted optically active mono- or dicarboxylic acids or their acid derivatives in the presence of a catalyst whose active component consists of rhenium or of rhenium and comprises at least one further element having an atomic number of from 22 to 83, with the provisos that
 - 10 a. the at least one further element having an atomic number of from 22 to 83 is not ruthenium and
 - b. in the case of the preparation of optically active 2-amino-, 2-chloro-, 2-hydroxy- and 2-alkoxy-1-alkanols by catalytically hydrogenating corresponding optically active 2-aminocarboxylic acids, 2-chlorocarboxylic acids, 2-hydroxycarboxylic acids and 2-alkoxycarboxylic acids or their acid derivatives, the at least one further element having an atomic number of from 22 to 83 is not palladium or platinum.
- 20 2. The process according to claim 1, wherein proviso b. is replaced by the proviso that the at least one further element having an atomic number of from 22 to 83 is not palladium or platinum.
- 25 3. The process according to claim 2, wherein the at least one further element having an atomic number of from 22 to 83 is selected from the group of the elements: Rh, Ir, Cu, Ag, Au, Co and Ni.
- 30 4. The process according to claim 3, wherein the at least one further element having an atomic number of from 22 to 83 is Rh or Ir.
- 35 5. The process according to claim 1 to 4, wherein optically active mono- or dicarboxylic acids or their acid derivatives are converted which have at least one stereocenter in the α - or β -position to at least one carboxylic acid function or acid derivative function derived therefrom to be hydrogenated.
- 40 6. The process according to claim 1 for preparing
 - a. optically active 3-hydroxy-, 3-alkoxy-, 3-amino-, 3-alkyl-, 3-aryl- or 3-chloro-1-alkanols starting from the correspondingly substituted optically active 3-hydroxy-, 3-alkoxy-, 3-amino-, 3-alkyl-, 3-aryl- or 3-chloro-monocarboxylic acids or their acid derivatives or

5 b. optically active hydroxy-, alkoxy-, amino-, alkyl-, aryl- or chlorine-substituted diols or triols or their cyclization products selected from the correspondingly substituted optically active dicarboxylic acids or their acid derivatives by hydrogenating both carboxylic acid functions or

5 c. optically active alkyl- or aryl-substituted alkanols starting from the correspondingly substituted optically active alkyl- or aryl-substituted monocarboxylic acids

10 in the presence of a catalyst whose active component comprises rhenium and palladium or rhenium and platinum.

15 7. The process according to claims 1 to 6, wherein the catalysts are used in supported form.

15 8. The process according to claim 7, wherein catalysts are used which, based in each case on the total weight of the finished catalyst and calculated as the metal, uses from 0.01 to 50% by weight of rhenium and from 0.01 to 30% by weight of the at least one further metal having an atomic number of from 22 to 83.

20 9. The process according to claims 7 and 8, wherein the support material used is ZrO_2 , TiO_2 , Al_2O_3 , SiO_2 , activated carbon, carbon blacks, graphites or high surface area graphite.

25 10. The process according to claim 9, wherein the rhenium and the at least one further element having an atomic number of from 22 to 83 is applied to the support in the presence of a reducing agent.

30 11. The process according to claim 1 to 4 for preparing 1,2-propanediol, 1,2-butanediol, 1,2-pentanediol, 1,3-pentanediol, leucinol, isoserinol, valinol, isoleucinol, serinol, threoninol, lysinol, phenylalaninol, tyrosinol, prolinol, 2-chloropropanol, 2-methyl-1-butanol, 1,2,4-butanetriol, 1,2,5-pantanetriol, 1,2,6-hexanetriol, 2,3-dimethylbutane-1,4-diol, 2-methylbutane-1,4-diol, 2-hydroxy- γ -butyrolactone, 3-hydroxy- γ -butyrolactone, 2-chloro- γ -butyrolactone, 3-chloro- γ -butyrolactone, 2-amino- γ -butyrolactone, 3-amino- γ -butyrolactone, 2-methyl- γ -butyrolactone, 3-methyl- γ -butyrolactone, 3-hydroxy- δ -valerolactone, 4-hydroxy- δ -valerolactone, 2-hydroxytetrahydrofuran, 2-methyltetrahydrofuran or 2-aminotetrahydrofuran.

35 12. The process according to claim 1 to 11, wherein the hydrogenation is carried out at a pressure of from 100 to 300 bar.

40 13. The process according to claim 1 to 12, wherein the hydrogenation is carried out at a temperature of from 30 to 180°C.

14. The process according to claim 1 to 13, wherein the hydrogenation is carried out in the presence of an acid.